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| APPLICATION NO. | FILING DATE | FIRST NAMED INVENTOR | ATTORNEY DOCKET NO. | CONFIRMATION NO. |
|-----------------------|-------------|----------------------|---------------------|------------------|
| 10/015,446 | 12/12/2001 | Norio Kanetsuki | 56775(70551) | 4596 |
| 21874 | 7590 | 07/29/2004 | EXAMINER | |
| EDWARDS & ANGELL, LLP | | | VINH, LAN | |
| P.O. BOX 55874 | | | ART UNIT | PAPER NUMBER |
| BOSTON, MA 02205 | | | 1765 | |

DATE MAILED: 07/29/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

10/015,446

Applicant(s)

KANETSUKI ET AL.

Examiner

Lan Vinh

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 24 June 2004.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1,3-9 and 15-17 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1,3-9 and 15-17 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on _____ is: a) ☐ approved b) ☐ disapproved by the Examiner.
- If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

- 13) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☒ Certified copies of the priority documents have been received in Application No. 10/015,446.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
- a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO-1449) Paper No(s) 072204
- 4) ☐ Interview Summary (PTO-413) Paper No(s) _____
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: _____

DETAILED ACTION

Continued Examination Under 37 CFR 1.114

1. A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114. Applicant's submission filed on 6/24/2004 has been entered.

Claim Rejections - 35 USC § 102

2. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

3. Claims 1, 3-4, 6-9 are rejected under 35 U.S.C. 102(e) as being anticipated by Hsia et al (US 6,328,848)

Hsia discloses an in-situ plasma etching method. This method using a mixed process gas supplied into a process chamber to generate plasma to etch/process a wafer/substrate (see abstract). Hsia discloses that the substrate having a stacked films includes a metal (Ti) and an ARC films (TiN) (col 5, lines 44-46) to be etched and the

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gas mixture ratio is changed in accordance with the material of a film to be etched (col 6, lines 17-27, col 10, lines 30-39), which reads on the substrate includes stacked films of at least two types to be etched, and according to any of the films that to be etched, a change is made in the process gas in a plasma generation period. Hsia also discloses that the plasma may remain intact and a gradual change in the gas composition may be affected to initiate the metal etch (col 9, lines 40-42), which reads on a change is made in the process gas in a plasma generation period without extinction/regeneration of the plasma. Hsia further discloses changing the bias power/voltage applied to the substrate with the change made in the process gas (col 10, lines 33-40)

Regarding claims 3-4, 6, Hsia discloses changing the RF plasma power/output of a plasma exciting power (a plasma generating condition for stably maintaining generation of the plasma) together/simultaneously with the change made in the process gas/changing the gas mixture ratio in the plasma generation period/etching period (col 10, lines 33-40)

The limitation of claim 8 has been discussed above

Regarding claim 9, Hsia discloses that the process gas includes Cl₂ and argon (col 9, lines 45-49)

4. Claims 15-16 are rejected under 35 U.S.C. 102(e) as being anticipated by Hsia et al (US 6,328,848)

Hsia discloses an in-situ plasma etching method. This method using a mixed process gas supplied into a process chamber to generate plasma to etch/process a

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wafer/semiconductor substrate (see abstract). Hsia discloses that the substrate having a stacked films includes a metal (Ti) and an ARC films (TiN) (col 5, lines 44-46). The method comprises the steps of: etching the ARC layer/first etching with plasma on the stacked films by using a first process gas in the plasma chamber (col 10, lines 30-33), the plasma may remain intact after completing the etching of the ARC layer (col 9, lines 39-41), which reads on completing the first etching without extinguishing the plasma, etching the metal layer with plasma on the stacked films by using a second process gas different from the first process gas in the plasma chamber (col 10, lines 37-40). Hsia also discloses that the plasma may remain intact and a gradual change in the gas composition may be affected to initiate the metal etch/second etch (col 9, lines 40-42), which reads on the plasma is maintained without being extinguished until the second etching is started

Claim Rejections - 35 USC § 103

5. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

6. Claim 5 is rejected under 35 U.S.C. 103(a) as being unpatentable over Hsia et al (US 6,328,843) in view of Bowker (US 4,687,543)

Hsia's method has been described above. Unlike the instant claimed invention as per claim 5, Hsia does not disclose changing the gas pressure within the chamber

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although Hsia discloses the step of setting processing parameter such as pressure and controlling the processing parameter through the use of a controller (col 9, lines 2-17)

Bowker discloses a selective etching method comprises the step of changing the gas pressure within the chamber during etching (col 6, lines 35-42)

Since Hsia is concerned with controlling the processing parameter and etch selectivity (col 10, lines 6-7), one skilled in the art would have found it obvious to modify Hsia's method by using the controller to contro/change the gas pressure within the chamber as per Bowker because according to Bowker changing the pressure inside the chamber provides adequate selectivity (col 6, lines 40-46)

7. Claim 17 is rejected under 35 U.S.C. 103(a) as being unpatentable over Hsia et al (US 6,328,843) in view of Whetten (US 5,153,754)

Hsia's method has been described above. Unlike the instant claimed invention as per claim 17, Hsia fails to specifically disclose processing/etching the stacked layers on the substrate to form a liquid-crystal display device (LCD)

However, Whetten discloses a method for forming a LCD comprises the step of processing/plasma etching the stacked layers on the substrate to form a liquid-crystal display device (LCD) (col 6, lines 45-47, col 6, lines 66-68)

Hence, one skilled in the art would have found it obvious to employ Hsia step of etching a stacked layers to form a LCD in view of Whetten's teaching because according to Whetten, the plasma etch will etch the Ti layers simultaneously and at the

same rate, to prevent undercutting and possible step coverage problem (col 6, lines 66-68)

Response to Arguments

8. Applicant's arguments with respect to claims 1, 3-9, 15-17 have been considered but are moot in view of the new ground(s) of rejection.

Conclusion

9. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Lan Vinh whose telephone number is 571 272 1471. The examiner can normally be reached on M-F 8:30-5:30 PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Nadine Norton can be reached on 571 272 1465. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>.



LV
July 22, 2004